

United States

Freiser

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[54] FAST TURN-OFF NEMATIC LIQUID OPTICAL DEVICES

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[51] Int. Cl. G02f 1/28

[58] Field of Search 350/160 LC; 252/408 LC; 23/230 LC

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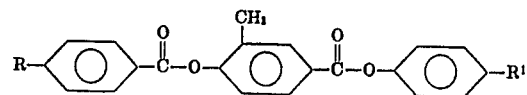
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[57] ABSTRACT

There is disclosed herein a novel nematic liquid crys-

tal optical device of the type wherein the variation of the orientation and the index refraction of the nematic fluid is effected by means of an applied electric field. The device is disposed between crossed polarizers and, in operation, light passing through the device is extinguished when a sufficient voltage is applied to the device to align the bulk of the nematic fluid in the direction of the applied field, the cell being transmissive in the quiescent, parallel aligned state. The device is characterized by relatively fast relaxation times from the driven to the quiescent state, such characterization being imparted to the device by the use as the nematic fluid therein of a nematic material which is operative at room temperature and which has a reversal in sign of its dielectric anisotropy, i.e., a positive-negative dielectric anisotropy material. Such material is one which is constituted of molecules possessing a dipole moment at an angle to the long axis of the molecule, the latter angle depending upon the magnitude of the dipole moment and on the anisotropy of the electron polarizability of the molecule. Examples of such positive-negative anisotropy materials are those represented by the following general structural formula



wherein R and R' are radicals selected from the group consisting of alkyl radicals having one to 12 carbon atoms.

3 Claims, 5 Drawing Figures

